GLEANER

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Mrs. Jean H. Work

From northern New Jersey, Mrs. Work came to Delaware Valley College in the early 1950's. After positions in the Accounting Department as a secretary to the President, Mrs. Work became Administrative Assistant in 1959.

As resident of Doylestown, Pennsylvania, Mrs. Work is active in civic affairs as well as in the Doylestown Country Club where, as a member, she is an avid golf enthusiast.

Mrs. Work has a great deal of respect for the student body of Delaware Valley College. Her office door is always open to "her Boys" and she will eagerly discuss student activities with an open mind.

We are especially honored to dedicate the Fall-Winter 1969 issue of the GLEANER to Mrs. Jean H. Work for her sincere interest and devotion to the students of Delaware Valley College of Science and Agriculture.

Exotic Foods From Field & Forest

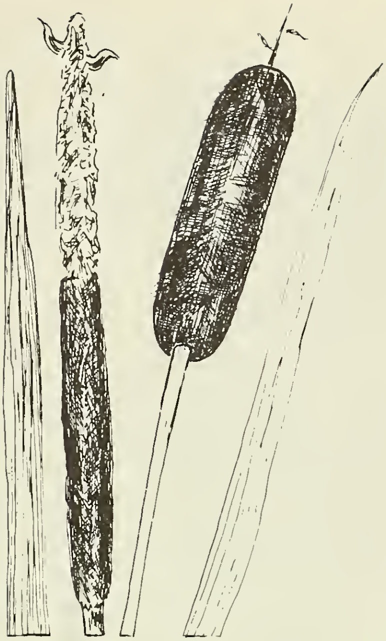
by David Benner, Instructor
Illustrated by John Magin '71
& Quentin Schlieder '70

Have you ever eaten Mayapple Marmalade? I believe I can safely say that you have not unless you made it yourself. This ambrosia is not to be found even in the finest gourmet shop. Not only does it possess a delicate, pleasant flavor, but a beautiful golden-amber color and a wonderful fragrance. As most everyone knows, the root, stem, leaves, and green fruit of the Mayapple are poisonous. It is the bright yellow fruit which ripens from September into October that is edible either raw or cooked. Now, how to make this Marmalade. Gather two quarts of the ripe fruit which should be soft and smell like grapes. Remove stem and blossom ends, cut in pieces and simmer in 1 quart of water for about 20 minutes, stirring to keep from sticking. Then put through a colander or sieve to remove seeds and skin. To 4 cups of pulp add 1 box of Sure-Jell and bring to a boil. Then add 5 cups of sugar. Stir constantly and boil several minutes. Skim off foam and pour into scalded jars or jelly glasses. When cool, seal with paraffin.

One other note about the Mayapple *(Podophyllum peltatum).* You may gather roots in October or November and cut them up in small pieces. Add one teaspoon of root to a pint of boiling water. Take one teaspoon at a time of this liquid as required for constipation. (Not recommended for use with the Hong Kong Flu)!

Long before the white man settled in America, the Indians were using acorns as an important food crop. Naturally, the sweet acorns were preferred but most species were gathered and eaten. I have found White Oak *(Quercus alba)* and Mossycup Oak *(Quercus macrocarpa)* to be the sweetest and easiest to use. Since squirrels crave these too, it is often difficult to gather many. It is rather time consuming to prepare acorns for cooking purposes, but well worth the effort. Let us assume you have gathered about 2 quarts of acorns. Cut each acorn lengthwise with small pruners (watch your fingers)! Pick out the acorn halves (they often fall out of the shell) and grind them as fine as you can in a food chopper or grinder. Put this coarse meal in a muslin bag, tie the bag, and place it in a kettle. Pour boiling water over the bag to remove tannin and squeeze out the excess water. Open the bag and spread the acorn meal in thin layers on shallow trays to dry out in a warm place overnight or in the sun. When it is dry, you may grind the meal again if you wish. It does not have to be dry or reground for the following recipe – *Home-made Acorn Bread.* Use any recipe for home-made white bread substituting one cup or more of acorn meal for the same amount of white flour in each loaf of bread. The result is a nutritious, dark-colored bread with its own distinct and delicious nutty flavor.

The Common Cattail *(Typha latifolia)* has many uses as a food. The main root contains starchy granules which can be used like flour but it is a



TYPHA LATIFOLIA CATTAIL

J. Magin '71

messy job to gather the roots and remove the starch. It is much easier to gather the ripe pollen in June or July. Take a pail or flat pan and bend over the flower spikes, tapping them into the pail. The abundant pollen will fall out and in a very short time you can gather a quart of pollen. Pick a warm sunny day to collect this material and prepare to get wet feet unless you have high hipboots. As far as I know, cattail pollen has not been analyzed, but it is no doubt high in protein as are other pollens. Its brilliant yellow color may be due to carotene, which would be a natural source of Vitamin A.

Cattail Pollen Cake, Muffins, or Shortcake – Any of these can be made by substituting 1 or 2 cups of cattail pollen in place of white flour called for in the recipe. You will be rewarded with a golden cake, muffin, or shortcake with an unusual and pleasant flavor. The pollen can also be used in making pancakes or biscuits.

DIOSPYROS VIRGINIANA PERSIMMON

J. Magin '71

Our native Persimmon *(Diospyros virginiana)* is a small sweet fruit when ripe; it is horrible tasting when not ripe. The fruit should be soft and it is best after several frosts. It contains alum which puckers your mouth and tongue if it is not fully ripe. Raccoons, other small animals, and deer are fond of persimmons. The best way to gather them is to shake the small trees. Persimmons are common in the southern states but are also found throughout Pennsylvania. Take a big sheet of plastic or an old sheet or blanket, place it under the tree, and start shaking. One quart of persimmons when put through a colander makes about 2 cups of pulp – enough for an old-fashioned *Persimmon Pudding* the color of gingerbread. Mix together in a large bowl:

1¼ cups sugar	1½ cups flour
1 teaspoon baking powder	1 teaspoon soda

½ teaspoon salt

Add and mix to the above:

3 beaten egg yolks	½ cup melted butter
2 cups persimmon pulp	2½ cups milk

Now fold 3 stiffly-beaten egg whites into the above mixture. Bake in 2 greased glasses or pottery baking dishes at 325° for about 50 minutes. It is best served warm with cream or plain and serves 10 to 12 people.

You can also make molasses and beer from persimmons. Mix 10 pounds of wheat bran with a gallon of ripe persimmon pulp. Bake the pulp in an oven until brown and firm. Break the pulp into pieces and put it through a food chopper. Put this in a 5-gallon crock and fill the crock almost full with boiling water. Let it stand for 12 hours. Pour off this liquid and boil it down to desired consistency.

There are so many other excellent nutritious and delicious foods that can be gathered and eaten with little effort. Let me mention a few you should try. In the early Spring, gather the common Wild or Black Mustard *(Brassica nigra).* Cook it like spinach and serve it hot with salt, pepper and butter. It is far superior to cultivated spinach and full of vitamins and trace elements. Pokeweed *(Phytolacca americana)* is far tastier than Asparagus without any unpleasant 'after-effects.' Cook new stems like Asparagus, pouring off the first boiled water and boiling again in fresh water. It can be picked in early Spring when 6 to 10 inches high. Note, however, that the roots, leaves, old stems and berries of pokeweed are poisonous.

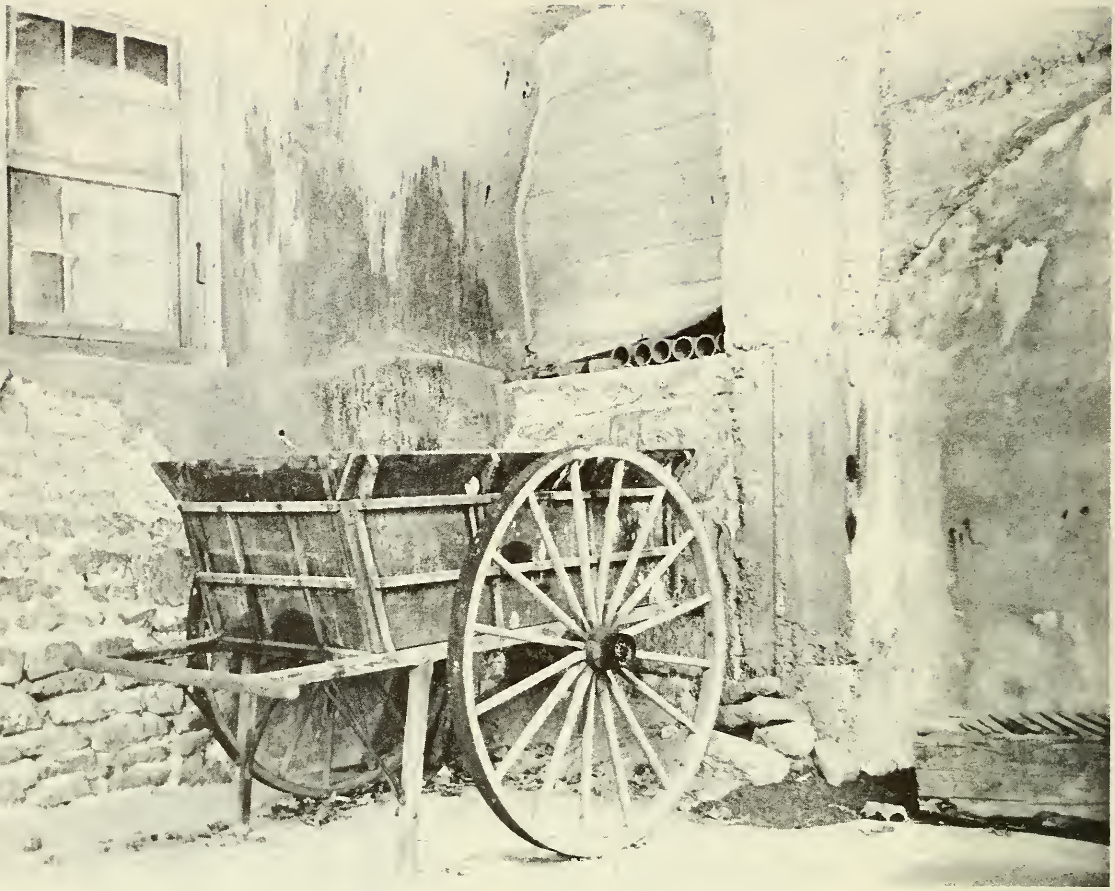
HEMEROCALLIS FULVA
TAWNY DAYLILY
John Magin '71

The flower buds of the orange Daylily *(Hemerocallis fulva)* can be picked and cooked like string beans. They are wonderful in stews. One of the finest teas known comes from the small trailing Snowberry *(Chiogenes hispidula).* The small white berries have a delicate wintergreen flavor. It is common in New England – especially in the Maine woods.

Then there are candied Wild Ginger, Sassafrass Tea, sliced Puffballs sauteed in butter, Wild Strawberry Shortcake and Jam, Wild Rice, Water Cress Soup, Pickled Walnuts, Ground-Cherry Pie, Hickory-nut Cake, and Wild Cherry Punch, to mention but a few.

One word of caution when gathering foods in the wild today – care should be taken to avoid areas recently sprayed with herbicides and pesticides.

For many more recipes and facts about eating wild foods, "Stalking the Wild Asparagus" by Euell Gibbons is the best book on this subject.



RETIRED

Jeffrey A. Wohlfeld

* * *

Stephen Maddock Cooper '70

The flower long lost to fruit,
the bud, gone to flower;
seed blown away:
love lost to lovers . . . alone.
'69

Dick Pflaum '70

CURRENT OF LIFE

The old man wandered through the dense trees until he came upon a clearing which led to a river. There he stood and watched as the tremendous current thundered along. He had been here countless times before – watching, thinking, seeking. This was his place, his secret place.

Since he was just a small boy he had come here to marvel at "his" river. In those days life was lazy and he had spent many good times playing here. Later, as a young man, this was his place to work out problems and think about his future. Now he was here only to watch, wait, and remember.

Sitting there, leaning against a huge slate-gray stone, he remembered how it used to be. These racing rapids had once been a clear calm stream. Many things had changed since then. The waters now seemed bigger, faster, and more dangerous.

As he sat there watching the gray but foamy water rush by, something caught his eye. Far upstream, near a bend in the river, he could see it. It was something red. He rose and strained to see it, covering his brow like a salute, (trying, but in vain) to block out the reflection on the water.

The swift current brought it closer and the old man could now visualize its form. It was a boat–a red rowboat.

The struggling boat was being carried helplessly by the turbulent and merciless current. The old man's heart reached out to the torn and battered object that had once been a useful and beautiful boat. But now this boat was being carried along by the whirling current.

Many rocks and mounds of marble lined the banks, and huge boulders jetted out in its middle, presenting almost unconquerable obstacles in the boat's path. Swaying from side to side the boat scraped and scuffed against the razor-sharp rocks, each time injured and impaired by the scars it received.

Looking ahead further downstream, the old man could see a giant, jagged rock standing boldly in the path of the on-rushing boat. "If this boat could only make it past that one rock . . . " sighed the old man unaware that he was talking aloud. Yes! If it could make it past that one last obstacle, the boat had a chance of being caught in a small whirlpool and then eventually being washed ashore.

As the boat swiftly approached the huge boulder, the old man's temples throbbed violently in anticipation of what was to come.

Helplessly caught in the mighty current, the boat was doomed. Faster and faster it rushed onward. It struck, flurted over, and was gone.

They found him there the next day – dead, his hands stretched out toward the water.

Further downstream young boys were playing in the clear calm water.

John D. Martin '70

THANKS FOR EVERYTHING

For once you're not nagging me. You're not telling me what a poor husband I am. You're not poking fun at the way I dress or telling me what grubby friends I hang-out with. You're not talking, or nagging, or complaining now, and you will never open your mouth again. You're dead!

Frank McDonough '70
Illustrated by Don Snively '70

SCIENTIFIC RESEARCH IN CHEMISTRY – PART II

Since the first article concerned itself with research in the field of inorganic chemistry, this one will discuss research in organic chemistry. In recent interviews with Dr. Orr, Dr. Lazarus and Mr. Lugar, their scientific endeavors were discussed.

Dr. Orr, Chairman of the Chemistry Department, explained that his interest involved further research on the work which he began as a graduate student at the University of Delaware. He stated that this work entailed studying the reactions of metals with acetyl chloride and aromatic ketones with the primary interest being to see if a correlation can be found between the position of the metal in the periodic table and the products of the reaction.

In his previous work, using zinc as the metal and benzophenone as the ketone, he found benzo pixacolone as the major product and if tin or iron were reacted with benzophenone, the major product would be tetra phenyl ethylene.

As a graduate student he used this method (the tin and acetyl chloride) as a reducing agent to prepare a number of tetra aryl ethylenes which were used in the study of the mechanisms of chromatic acid and cerium oxidations of tetra aryl ethylenes. At Delaware Valley he would like to extend this program and test other metals in this reaction sequence and observe the products with the positions of the metals in the periodic table as hopefully being a determining factor.

Mr. Lugar stated that the work he is involved with is in conjunction with his doctoral program. His project is in the field of Conformation Analysis, that is, determining the actual three dimensional arrangement of the atoms in a molecule. In particular, his interest is centered about the substituted cyclo pentanes. And since this ring system is in all steroids, his work is related to these compounds.

His actual problem of analysis is to determine the structure of methyl, ethyl, iso-propyl, and tertiary butyl cyclopentanes. Mr. Lugar explained that this work is purely theoretical in nature with no actual reactions or handling of materials to be done. It involves taking into account the energy required to bend the bonds in a molecule and the energy involved in torsion of the carbon-carbon bonds. Also, the electrostatic interactions of the non-bonded atoms must be included in the calculations.

Aided by a computer in processing the data, his work involves summing all these factors for a variety of hypothetical conformations, and choosing that conformation for which the energy is minimum.

Dr. Lazarus is presently involved in a continuation of research begun at Lehigh University while working on his doctoral program. An abstract of his doctoral thesis on tetravalent sulfur appears in the Journal of Organic Chemistry (October, 1968). Part of his work dealt with nuclear magnetic resonance analysis of 1-methyl-2,5-diphenyldithiinium tetrafluoroborate. The tetrafluoroborate salt was prepared by alkylation of 2,5-diphenyl-1,4-dithiin with methyl iodide and a silver tetrafluoroborate complex in an aprotic solvent system. The geometry of the salt is uncertain at present.

The objective of this work was to determine whether the sulfonium center (generated by alkylation) would accept electrons from the pi-system of the ring into energetically favored open 3d levels to give a molecule containing tetravalent sulfur. Nuclear magnetic resonance studies of this compound showed that the 3d orbitals do accept electrons from the pi-system. There was also indication that the other sulfur atom participated at least to a limited degree, to further stabilize the novel resonance system.

The important point at present is the synthesis of 1-methylbenzodithiinium tetrafluoroborate and 1-methylbenzoxathiinium tetrafluoroborate. These model compounds will be used to determine the degree of participation of the second hetero-atom. Since the two compounds are essentially planar, the degree of participation of the second heteratom will depend only on electronic considerations rather than both geometric and electronic considerations in the 1-methyl-2,5-diphenyldithiinium system.

* * *

William Pellet '70

PREPLANNED CELLOPHANE

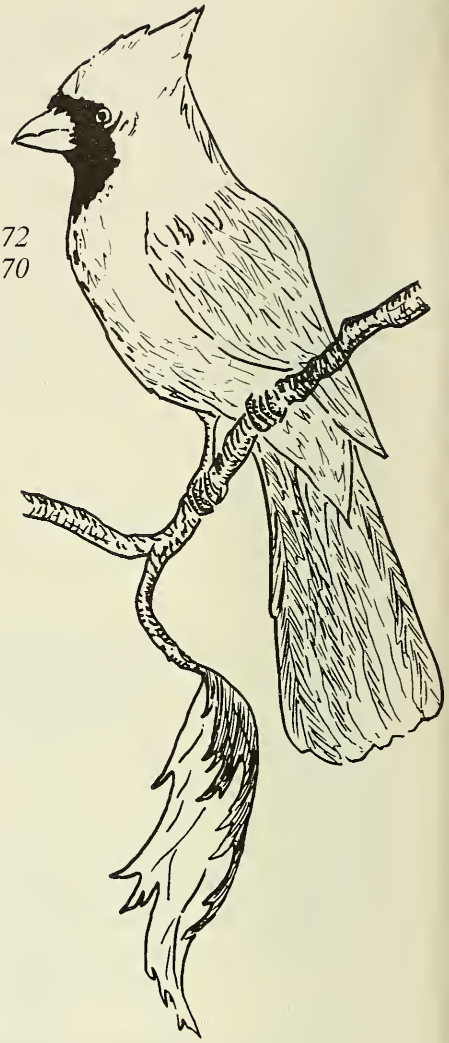
To know her is to know the warmth
of happiness.
Perhaps few have felt its touch.
This is not something you can learn,
you must experience.

With softness and understanding, a hand
is there to guide.
Your lives are not separated but remain one.
The vision before you, with outstretched
hand, can not be fully explained.

The hope evolved brings a feeling that
all will remain.
With her, all is not what the preplanned
cellophane shows.
For the hand is as it originally was
meant to be.

Together, and with mutual sharing, life
will exist.
Not as digital nothingness, but as unimagined peace.
To be able to converse. . . . .

Richard Polgar '72
Illustrated by Quentin Schlieder '70



I HAD A DREAM

Once I had a dream . . .
Cardinals chirped their tune
In the warm breeze of June
As children sung with joy,
While running after a toy.
I saw lovers on a picnic eating cake,
While feeding popcorn to ducks on the lake.

But then I woke . . .
Children screamed and ran for cover
As bullets flew and helicopters hovered.
Two days without food and two days till . . .
Till the "enemy" would come and we must kill.
Listen closely to the soldiers and you can hear
Pleads for the end of this nightmare.

D. Lee Strassburger '70
Illustrated by Quentin Schlieder '70

FLORAL CHARACTERISTICS OF THE ORCHID

CATTLEYA FLOWER

L. Ivins Smith III

There are seven floral parts to the typical orchid flower; three sepals, three petals, (one which is called the lip or labellum which is a highly modified petal and in most cases is the showiest part of the flower), and a gynandrium or column.

The sepals are the other whorl of segments, usually three in number, but in certain genera like the Cypripedium, two are united to form the standard.

Two of the three petals are usually similar in shape and color to the sepals. The third is variously modified into a tube or sac. This tube or sac is called the labellum or lip, and is usually the most intensely colored part.

The column is the reproductive part of the flower and the primary feature distinguishing the orchids from other Angiosperms. The column contains female (pistillate) and male (staminate) sex organs. The female organ consists of a sticky surface, a rather convex area in the column below the rostellum. However, in a few genera they are elevated on stalks. The stigmatic surface is separated from the pollen bearing areas by a fleshy outgrowth called the rostellum. This is for preventing self pollination, although, even as a general rule, the carpels are not receptive to the pollen from the same flower, thus the flowers are self sterile. Inside this column is a canal. This canal is continuous with the capillary to which stamens and stigmas are borne at the upper end. Usually the column is well developed, but in some species it is short and inconspicuous. The lip is usually attached directly to the column although in some species the column is free from the lip. The canal travels below the column into the ovary.

The ovary, structurally is three celled, but the partitions of the cells are not always evident, thus giving the appearance of being unicellular. This is found at the base of the outer whorl of sepals which could be considered in appearance to the flower stalk. That is the reason the orchid flower is sometimes considered botanically inferior.

After pollination the ovary ripens slowly into the fruit. In most genera it is a dry capsule taking often nine to twelve months to ripen to a condition in which is naturally dehisces. The seeds are numerous and minute. *Cattleya*

DETAIL OF A *CYMBIDIUM* FLOWER

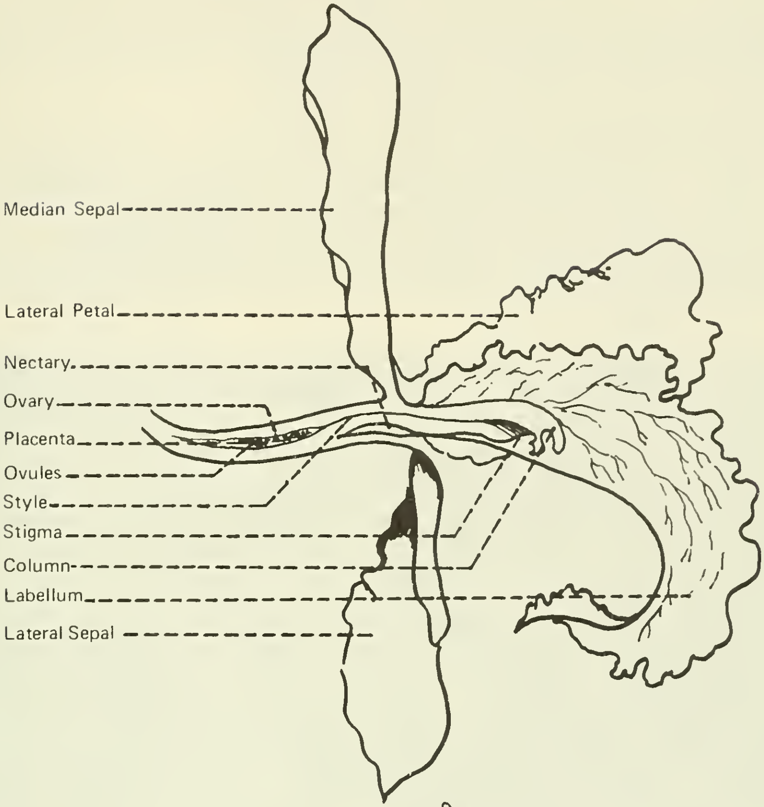
L. Ivins Smith III

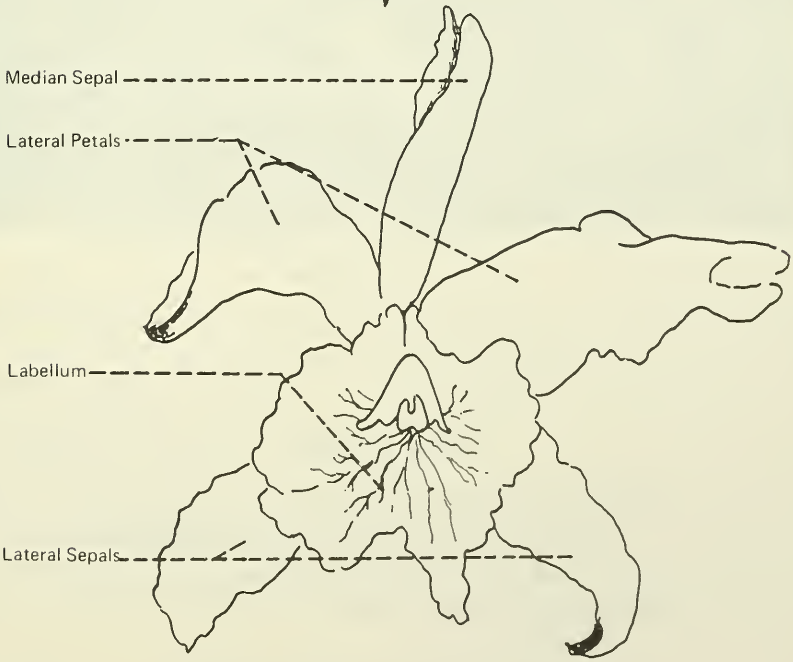
gigas has been reported to contain 500,000 to 700,000 seeds. The minuteness of these seeds makes it impossible for the storage of sufficient food reserve to nourish the embryo during the germination period. In some genera complete germination and growth is impossible unless some outside food source is available to the plant. This the breeder does by adding nutrients to the medium, such as agar, on which he sows his seeds. When this is done, everything must be sterile.

The most important thing that the breeder must keep in mind is that the seed capsule must be allowed to ripen fully on the parent plant to insure proper maturity of the seed. Therefore, the pod should be covered with a bag to prevent the loss of seed if it should naturally dehisce, and to prevent harmful fungi from developing in the seed pod in case it should get wet.

The embryo is oval shaped and undifferentiated except that the basal cells are larger than the apical cells or the meristematic region. At the base is a delicate suspensor. The whole embryo is enclosed in a transparent integument with an opening at the lower end which the suspensor protrudes through. The maximum length of the Cattleya and Laelia embryo is 1/75 of a micron. In germination the embryo enlarges transversely until a small spherical stage is reached. The formation of chlorophyll accompanies thus but is more pronounced in the meristematic region. When the embryo enlarges enough to rupture the embryo sac, it is 270 microns long and 175 microns wide. Absorbing hairs then develop near the basal region, and a larger spherule or top-shaped structure is attained. This is characterized by a marked depression at the upper surface. In the center of the depression the first leaf point appears, which subsequently develops into the first leaf. There is a continual increase

CROSS SECTION OF A CATTLEYA ORCHID





FRONTAL VIEW OF A CATTLEYA ORCHID

in the diameter of the embryo, so that a disc-like structure is formed called the protocorm. At the meristematic region, a second or third leaf may form which finally shows elongation and a distinct stem. Then the first root may arise from the protocorm or from the stem below the second or third leaf. This period of development is generally from four to six months in nature, but under greenhouse conditions, this is shorter.

The Orchid family is one of the most numerous, intricate and unusual plant families in the world. Their geographic distribution makes them indigenous to every clime. It is evident to even the casual observer that indeed orchids surpass other flowers in their evolutionary specialization.

Perhaps, now, the reader respects the orchid for more than its quality as an expensive corsage.

Cymbidium **Spike**

L. Ivins Smith III

Steven Schwartz '71

ALL OVER

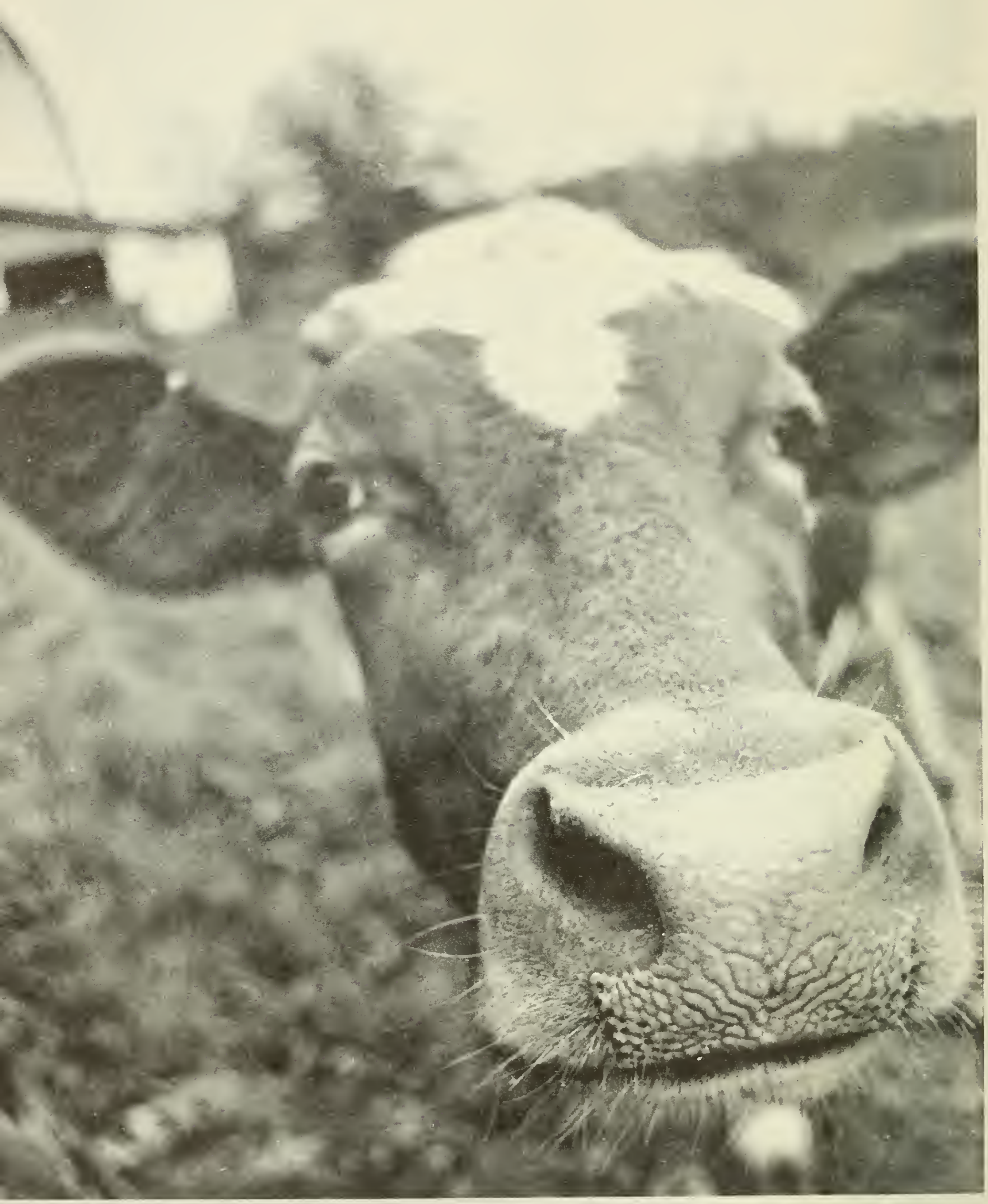
Where the sun rises and sets;
with the stars and moon visible by night,
You'll find me.
Let no face or place ever be out of my
reach,
Let my eyes see what the whole world
lets pass by.
Perhaps, I can keep the entire faith;
I know I can not.

WE THE DEAD, NEW ROT

Stephen Maddock Cooper '70

Death is screaming horror called so loud,
 to saw my heart in two.
Priest hand me no peace,
 least I hate a little less,
The Cause that has lain me here;
 to watch over worms and patriots.
Square is the stone that caps my head
 with name, rank order of death, and home.
A place there is for a son of mine,
 God be damned . . . be it ever filled.
A crater grown cold yet smoldering
 with the blood of fathers . . . and what might have been.
 could not pierce as does this crater's grass.
For it is these green blades
 that we do nourish.
The ladle dips deep the dredge,
 to find new room in the bowels of the Punchbowl.
Ay, the Punchbowl slowly fills,
 not with ash or molten rock;
But with sons of father's blood,
 dreams and tears and what might have been.
Hate as I did the battle I fought,
 the rage lay dormant within my heart,
For whim of Government we were murdered,
 for love of country . . . we have died.
Damned are you that walk my grave,
 yet will not see the Punchbowl flow over.
Damned are you that walk the sea,
 yet will not see what might have been.

'67 – The National Cemetery of the Pacific



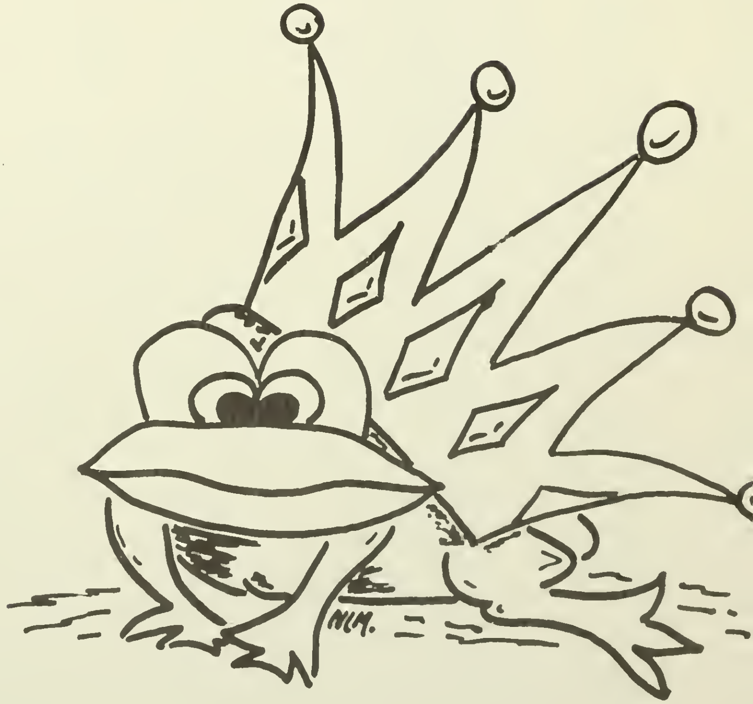
Ed always said I had the prettiest eyes

L. Ivins Smith, III '70

John D. Martin '70

ODE TO A TOAD

He was a Prince switched to a toad
By some wicked old witch named Moramode.
He'd eat flys and stuff and hop around
Looking for a kiss to return his crown.
From town to town he'd state his case,
But he'd lose it every time they'd see his face.
Well, he's still hopping around to this very day;
So, if you're a pretty girl and he comes your way,
Remember what this poem had to say and
Give that toad a great big kiss.
Who knows, you may become a Princess.



Abbott Lee '73

UNIONISM AND AGRICULTURE

There is no longer any doubt; Congress will extend collective bargaining to agricultural workers. Final action probably won't come until next year. The real battle at this time is over the specific form the legislation will take.

As usual, labor is almost solidly united in their drive. Labor Bill S8 has already been introduced by Sen. Harrison Williams of New Jersey, and co-sponsored by Kennedy, Javits, Muskie, McGovern and 15 other senators.

Under S8, featherbedding is permitted. An example of featherbedding is nine mine owners paying the U.M.W. $200 million for the privileges of using their own machinery in their own mines. Recently Cesar Chavey, leader of the grape boycott, said he would be willing to let growers mechanize, but he said growers would have to split the profit 50-50 with the unions.

The union shop is another concept of labor. If the majority of workers vote for union representation all the other workers are required to join and support the union policy. No new workers would be hired unless they join the union. The Taft-Hartley Act tackled this concept by permitting individual states to pass right - to - work laws. Several states have banned compulsory unionism. S8 would set up a union hiring system requiring that farmers fill job openings from union referrals.

S8 also leaves unions free to impose fines on their members for not backing union policy. One example of this is the Wisconsin Motor Corporation, which recently offered pay incentives for extra output. Some workers could turn out more engines in three hours than others could all day. The union imposed work ceilings, limiting these workers production. Workers that exceeded the union ceiling collected extra pay. The union then fined the men from $50-$100 dollars each. They appealed to the National Labor Relations Board, which found in favor of the unions.

When the union uses its striking power it usually stops production. Many times the industry will have a stock of their product in case of such a strike. During the strike the factory or office lays paralyzed. After the strike has been settled the factory or office can swing back into production, perhaps at an accelerated pace, to make up for lost time.

Let us term a situation as a factory or office as an inorganic business, and examine the same striking power in agriculture, or organic business. Agriculture is not a business where production is strictly a result of labor and machinery as it is in all other businesses. Instead, prodcution results from labor and plant and animal lives. Farmers have taken wild plants and animals and controlled their environment to a point where these living organisms depends on human care to substain life. None of the farmer's stock can be left alone without attention, then several days later come back into production. Plants have a year-round schedule that must be met, and if it is not met they will either perish or be lost from production, depending on the crop. An effective strike at any time would leave a farmer only two choices. Either give the union whatever it asks or suffer loss of the crop, which not only means loss of his investment but a shortage of food in that commodity for the entire country. Under Bill S8, striking is not prohibited at any time.

If unions are to enter agriculture or the organic industry with such provisions as those in S8, labor would control America's agriculture in its entirety. What would be more of a threat to society than an organization that could create a dirth of food to increase their profits. Such a system would give entirely too much power to an organization that has recently displayed poor leadership in several instances.

Farmers do feel that collective bargaining is a basic right that farm employees deserve. The National Farm Bureau Federation (a farmers association) has organized several associations for farm employees.

It is up to Congress to decide if the present collective bargaining laws should be adjusted to fit agriculture, and if they should, how to do so.

Agricultural leaders recognize that the present administration provides a climate for favorable legislation. But organized labor's well-oiled, heavily-financed political machine is a tough opponent, even under the best circumstances.

* * *

Dillon Williams '73

When I think about my future life
I only see an old man's heart of strife.
I see a lonely, loveless child
Who's all alone when thoughts run wild.
I see a man consumed in bitter conflicts
As around his life his past constricts.
He sits in his chair, rocking to and fro
And thinks of his life and constant woe.
For years the sun for him has not shone
He rocks in dark, he thinks, and only groans.
Never has he known a lover's love
For many years ago the fates did dub
Him Bearer of all Sorrow and Sin
And ever must he bare his griefs within.
Joy and laughter never dare his life emboss:
Alone and silently he bares his cross.
When I think of how I am to die,
Alone and friendless, far from any eye,
I think of how I live today -
Unable to retreat - I stand at bay.

Donald Snively '70

Quentin Schlieder '70
Illustrations by Author

CYCADS: A LINK IN THE EVOLUTION TO HIGHER PLANT LIFE

Cycads have little economic value, but they are ornamental and paleontological curiosities. Their ornamental value is most realized in tropical landscaping, and in temperate zones, in conservatories in display and botanical gardens. They are paleontological curiosities in that they evolved to their present form back in the Mesozoic Era, and there is some indication that primitive cycads may have been living as far back as the Late Permian Era (4:194).

Breeding is carried on in the search for better display specimens. It should be noted, however, that there are no large scale breeding programs, but due to the unusual nature of these plants, botanical gardens such as Longwood, in Kennett Square, Pennsylvania, Garfield Park, in Chicago, as well as many inquisitive paleobotantists have conducted considerable research programs on this group of plants. Such programs have yielded a wealth of information concerning the cytology, life history, distribution, and genetics of cycads.

Cycads are palm-like plants believed to be among the most primitive seed plants in existance today. Modern cycads are often referred to as "coco palms" or "sago palms," and are found in limited numbers in tropical areas today. Cycads are generally characterized by cylindrical, erect trunks and large, fern-like leaves on short, thick stems (4:194). The cycads may be palm-like in appearance, but differ greatly from the palms in structure (1:385).

During the Triassic and Jurassic Periods, cycads were exceedingly abundant (5:378). These Gymnosperms are related to pines and spruces in their structure, but resemble palms superficially, and uncoil their long leaves in the manner of ferns. From the botanist's viewpoint, the Mesozoic Age was the Age of the Cycads, and these plants have changed little morphologically since that time.

Generally the botanical classification is as follows (6:103):

Kingdom	Plantae (Plant Kingdom)
Division	Tracheophyta (Vascular Plant)
Subdivision	Spermatophyta (Seed Plants)
Class	Gymnospermae (Cone Plants)
Order	Cycadales - - Woody plants with un-branched stems or with occasional adventitious branching. They are monoxylic and display mucilage canals in the pith and cortex. Some genera with additional coaxial vascular cylinders. The leaves are large and pinnate, rarely bi-pinnate. The leaf trace is diploxylic. Cycads are dioecious with reproductive organs in cones, except female Cycas. These cones may be terminal or lateral. The megasporophylls have

sterile tips and two to eight orthotropous ovules. The seeds are large. The microsporophylls are scale-like or peltate with pollen sacs on the abaxial side. The sperm have a spiral band of flagella.

Family.............. Cycadaceae
Genera.............. *Paleocycas, Cycas, Microcycas, Dioon, Zamia, Ceratozamia, Stangeria, Bowenia, Macrozamia, Encephalartos.*

The following key may be used to distinguish the different genera (2:163):

KEY TO THE GENERA OF CYCADACEAE

A. Leaflets with a midrib, but no side veins. Megasporophylls in a crown, through which the axis continues to grow. Sporophylls with several ovules along the side - - Oriental .... 1. *Cycas*

B. Leaflets with a midrib and pinnate side veins. Sporophylls, each with two ovules, forming a cone - - - Africa .... 2. *Stangeria*

C. Leaflets parallel veined, no midrib. Megasporophylls in cones, each with two ovules

a. Leaflets bipinnate - - Australia.............................. 3. *Bowenia*
b. Leaflets once pinnate
  1. Ovules on stalklike protrusions of the megasporophyll and arranged in a loose cone - Mexico 4. *Dioon*
  2. Ovules sessile. Ovules with
    (a) shield-shaped top with two strong horns – Mexico .... 5. *Ceratozamia*
    (b) Sporophylls shield shaped, without horns
      (1) Cones small; sporophylls in longitudial rows; leaves developed singly; mostly small plants - - Africa .... 6. *Zamia*
      (2) Cones large; leaves in crowns; mostly large plants - - Africa .... 7. *Encephalartos*
    (c) Sporophylls with a long median spine - - Australia .... 8. *Macrozamia*
    (d) Male sporophylls with a flat top; female sporophylls with a shield-shaped top - - Cuba .... 9. *Microcycas*

Today, after 200,000,000 years, only sixty-five species of the Order Cycadales remain. These sixty-five species are grouped into nine genera (6:106-107).

During their long existance, Cycads have had almost world wide distribution, however, today this group of plants is confined to three regions, South and Central America, Asia (including Australia), and Africa. One genus is relatively widespread in each area, while the other genera are restricted to relatively small areas. They are as follows:

Cycas (15 spp.) - - Japan, Australia, India, Madagascar.
Bowenia (1 sp.) - - Queensland and N. E. Australia.
Macrozamia (9 spp.) - - Queensland and N. E. Australia.
Encephalartos (14 spp.) - - South Africa.
Stangeria - - Natal.
Zamia (30 spp.) - - Florida to Chile.
Ceratozamia (2 spp.) and *Dioon* (3 spp.) - - Mexico.
Microcycas (1 sp.) - - Cuba.

Although the cycads are a primitive plant group, they do possess a number of quite intricate systems, several of which are retained in the evolution of higher plant groups.

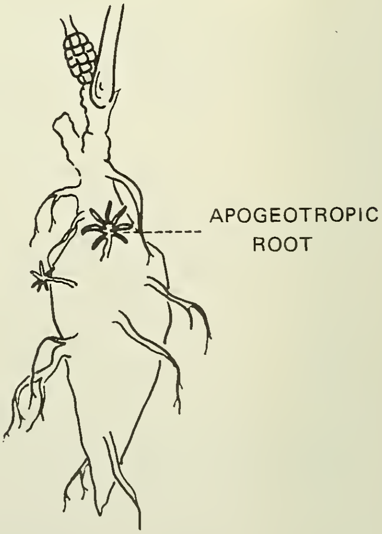
Basically, the life cycle can be conveniently divided into two phases - - the vegetative and the reproductive. There are three major areas of consideration under the vegetative stage, the stem, the leaf, and the root.

All species produce unbranched stems, although occasionally adventitious shoots appear giving the plant a branched appearance. In the arborescent species, i. e. *Ceratozamia, Cycas,* etc., the stem is trunk-like, and is covered by an armor of leaf bases (2:78). The leaf does not fall off as in most deciduous plants, but loses its leaflets, bends down, and decays to a point a few centimeters from the cortex, when an abscission layer appears and cuts the rachis, or main stem, off cleanly, leaving only a few centimeters of it to form the armor.

Other species, i. e. *Bowenia and Stangeria,* have tuberous, subterranean stems which lack armor. This stem is generally somewhat spheroid in shape.

In cross section, the stem has a large pith and a large cortex with a zone of wood in between. The amount of xylem in most stems is surprisingly small as is the amount of phloem in most species. The medullary rays are generally strong and conspicuous when the stem is seen in cross section. A strange feature in the anatomy of most cycad stems is the absence of growth rings. (On arborescent species an age estimate can be made by counting the number of the persistant armored leaf bases if the growth rate of the crown is known.) When growth rings do occur, as in *Dioon,* often they are not annual or even seasonal, but appear with the production of a new crown.

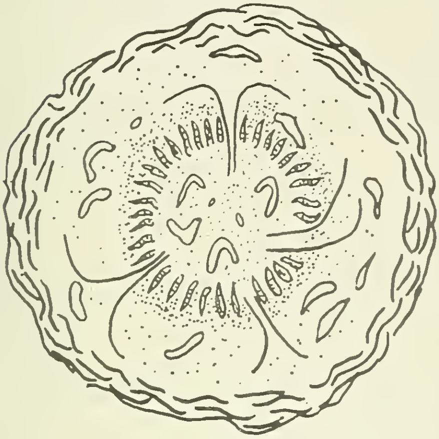
The most interesting feature from an evolutionary standpoint is the structure of the leaf traces and veins, in which there are two distinct kinds. One is a roughly triangular area of centripetal xylem, with a single protoxylem region; the other is separated from it by parenchyma and consists of an arch of tracheids associated with the phloem in such a way as to give the appearance of being secondary in



STEM OF BOWENIA SPECTABILIS SHOWING APOGEOTROPIC ROOTS origin. It is argued whether this should be regarded as secondary wood or centrifugal primary xylem (6:108). The important point is the presence of centripetal wood, since this is regarded as a primitive characteristic that has survived from some ancient protoxylic ancestor (6:108).

Young seedlings exhibit distinctly mesarch wood in their stem anatomy, even though the adult stems are entirely endarch.

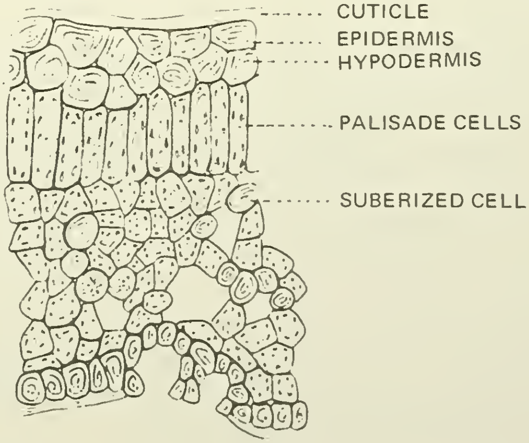
The course of the leaf traces in the cortex is peculiar, but not unique. The presence of "girdling bundles" can be seen in transverse sections of the stem. The leaf trace passes almost horozontally halfway around the stem, so that it enters the leaf almost opposite its point of origin, being joined at intervals by other leaf traces, so that each leaf receives a number of bundles.



CROSS SECTION OF THE STEM OF ZAMIA FLORIDANA SHOWING LARGE PITH AND CORTEX AND SCANTY WOODY ZONE.

The leaves are commonly referred to as fronds, and are pinnately compound except in the genus *Bowenia,* in which they are bipinnate. The leaves compose crowns, which are formed in spiral succession. The leaves are generally of the same size, except when very young. The length of the leaf varies from three meters (as in *Cycas Circinalis)* down to about five of six centimeters (as in *Zamia pygmaea).* The number of leaflets on each side of the rachis varies form more than one hundred in large-leafed species to three of four in dwarf species. As seedlings, the number of leaflets is often reduced to only one or two pairs in even those species which have a hundred or more leaflets at maturity.

The size of the leaflets also varies widely. In *Ceratozamia longifolia* the leaflets reach forty centimeters in width, while *Zamia angustissima* has leaflets seven centimeters long by one millimeter wide. Only two genera, *Cycas and Stangeria,* have a midrib in the leaflet. In other species leaflets have parallel, or dichotomous, veins.



TRANSVERSE SECTION OF PART OF A LEAFLET OF *DIOON.*

All cycads have xeromorphic features in their leaf structures. Fronds of all species have a heavy cuticle and deeply sunken stomata (6:108).

Generally the primary root is rather large and may exceed the size of the stem. In the seedling, the root is much larger than the stem, which, at this stage is rather inconspicuous.

DIOON SEEDLING

After the seedling becomes thoroughly established, the shoot increases in size and eventually surpasses the growth of the root.

The root is tetrarch. Secondary growth begins early and is somewhat irregular. All cycads have apogeotropic roots, i.e. they grow up instead of down. These roots branch profusely in a dichotomous fashion, forming a carolloid above the ground (2:98). These are peculiar in that they contain the blue-green algae, *Anabaena,* concentrated into a zone in the middle of the cortex.

Cycads are absolutely dioecious, i.e. male and female cones are borne on different plants. Some of the largest cones that have ever existed are found in living cycads. According to Chamberlain, cones of *Macrozamia denisonii* are often seventy centimeters in length and weigh thirty kilos. (One such cone was 37 inches long (one meter) and weighed 85 pounds (38.5 kilos). The cone was borne on a plant near Brisbane, Australia.)

The evolution of a compact cone from a loose crown of sporophylls can be traced very clearly through the living cycads. *Cycas revulata* shows the most primitive condition in the family, while the genus *Zamia* exhibits the most extensive development.

Except in *Cycas,*[1] the ovules of cycads are borne in compact cones. The sporophylls are arranged spirally around a central axis and bear two to eight reflexed ovules, which are protected by the overlapping of the tips of the sporophylls (as in *Dioon*), or by tightly fitting peltate heads (as in *Zamia and Macrozamia*). (6:111)

All of the male strobili of cycads are either a terminal or axillary compact cone, and they are usually smaller than the female cones. The microsporophylls are spirally arranged and bear microsporangia on the abaxial or lower side. The number of microsporangia on each sporophyll varies from well over a thousand in *Cycas* to as few as five or six in *Zamia.*

The microsporophylls are spirally arranged in acropetal succession, but the arrangement is so absolutely regular that, in surface view, they often look as if they were in vertical rows, like the grains of corn on a cob (2:112).

[1] Throughout the life of the female plant of *Cycas,* there is an alternation of fronds and sporophylls, produced by the same apical meristem, and the sporophylls are much more leaf like than in any other genus.

Due to this arrangement, the sporophylls at the top are the last to be formed, and hence, they are the first to ripen their pollen, "probably because ripening depends largely on drying, and these sporophylls are farthest from the water supply (2:112-113)." On large cones, the upper sporophylls may dehisce several days before the lower sporophylls. Sporophylls nearest the top and bottom bear less sporangia than those in between.

Unfortunately, there have been few organized breeding programs to date, and since there are abundant forms, sizes, shapes, etc. in wild types that it is doubtful if programs will ever be organized.

There are only about two areas in which future breeding would be advantageous. They are increasing plant hardiness in order to extend the range of the family into more temperate zones, and breeding to increase the number of fronds per plant to produce a better display specimen. Cycads are not attacked by insects or disease to any extent, and the plant already has xeromorphic adaptations making insect, disease, and drought resistant breeding programs unnecessary. These adaptations are probably a result of the cycad's long duration on this planet.

It is thought that most species are wind pollinated like most other gymnosperms since the pollen is light, dry, and easily blown by the wind. To date there has been no evidence to contradict this statement. Since cycads are wind pollinated, bagging becomes a necessity. Both the male and female cones are bagged prior to the opening of the sporophylls. When the sporophyls of the male cone dehisce, the pollen remains within the bag. This bag is then transferred to the female cone and pumped, giving a bellows effect and agitating the pollen. The bag is left on the cone for a number of weeks, since the interval between pollination and fertilization is about four to six months. The seed is collected when the female cone opens. (2:127-130)

Most crosses have been inter-generic in nature. Cycads hybridize freely. More than a dozen successful crosses have been made at the University of Chicago. However, only two are noteworthy.

One of the crosses was between *Zamia latifolia and Zamia pumila.* Seven seeds developed, producing two vigorous male, and two vigorous female plants. A male cone appeared on the one plant after six years from seed. A year later, three plants produced cones, one female and two males. Good seed was secured from this pollination and several F_2 plants are thriving. (2:152-153)

Cycads are a unique and interesting group of plants. Their morphology and physiology is the basis for that of higher plant groups. Hence, many of the methods used in hybridizing other plants can be applied to cycads. However, there is a great need for intense breeding programs to be carried out on this plant group. Cytological studies are also in need of revision. There are many areas yet to be probed in the life of Cycads.

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* * *

Dillon Williams '73

THE SWEEP OF AUTUMN

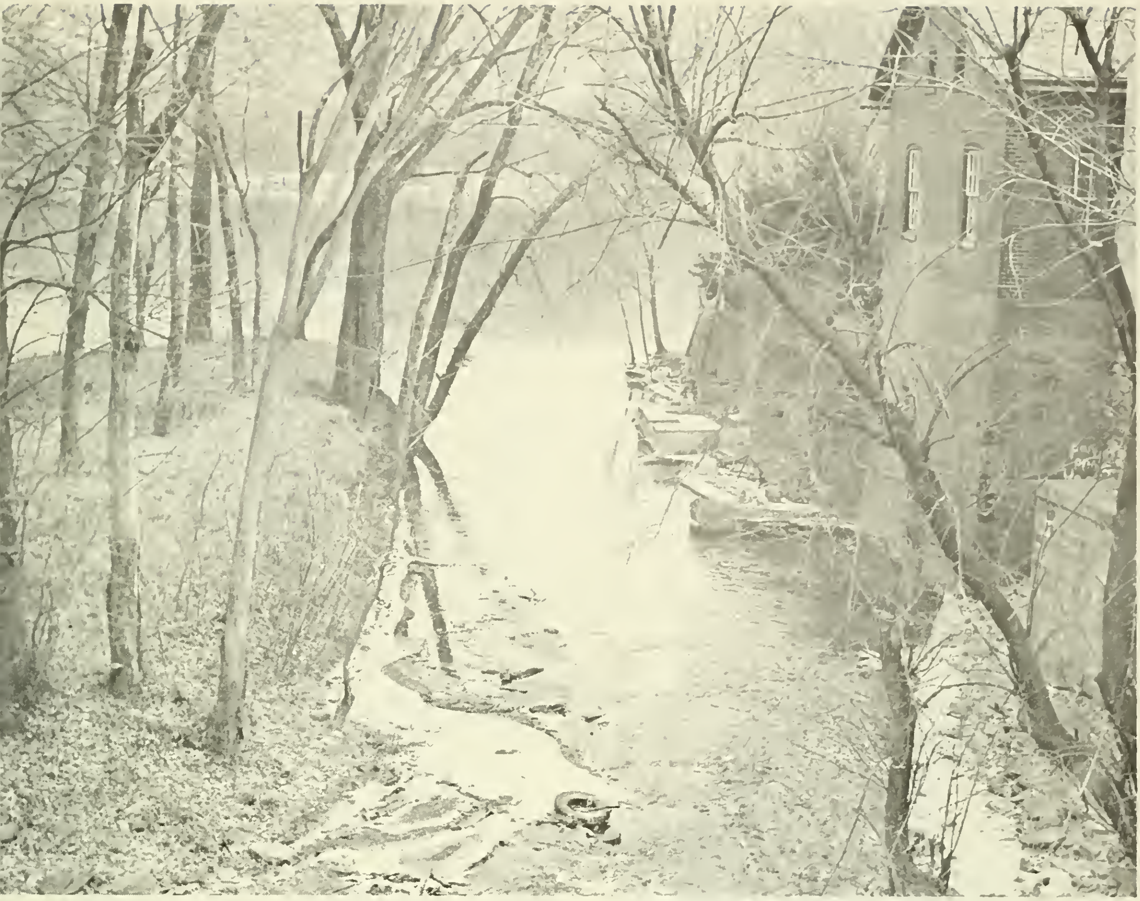
Autumn leaves float through the air
The grass is brown, the trees are bare;
The sky is blue with clouds of gray
The moon appears to end the day.

Jordan winds are blowing chilly
The last of the blossoms fades on a lily;
Two ducks glide across the pond
The sparkling moonlight leads them on.

The first flake of snow comes fluttering down
And melts before it reaches ground;
A sheet of ice quiets the stream,
All Nature's forces reign Supreme.

The woods are blessed with the gift of peace
Silently they sigh relief;
The tall green pine sways in the breeze
And the mighty oak gives up its leaves.

The earth lays down the rest
She yawns and draws her babes to breast;
No other sound until she wakes
But easy wind and downy flakes.



AMERICA THE BEAUTIFUL?

David Kamison

Stephen Maddock Cooper '70

Soon silence . . . . .
then nothing . . . . .
not even silence.
Poets gone with inspiration.

Now only low lonesome
noise.
Noise remains to drown the silence.
Yet noise asks not forgiveness
for its only intent.

Howard Henderson '70
Illustrated by Quentin Schlieder '70

AN OUTHOUSE

In this modernistic, ever-changing nation of ours, the outhouse might well be categorized as ancient. Yet one would venture to say that our grandfathers, and possibly even our fathers, remember sitting on that frost covered bench reading the morning paper. An outhouse, regardless of the circumstances, is seldom esteemed as being a sacred sanctuary. On the damp, gray floor lay the scattered remains of a comic book, which suffices to blockade numerous passing ants. The dull, brown walls are deeply scarred by the initials of temporary dwellers. All of which is overcome by the repulsive odor from below.

Norman Mogel '71
Quentin Schlieder '70
Illustrated by Norman Mogel '71

DISTELFINKS AND SHOO-FLY PIE

DISTELFINK

Pennsylvania enjoys a rich and distinctive array of cultural heritages which through the years have been admired, commercialized and misunderstood. Perhaps, the group most demonstrative of this fact is the Pennsylvania Dutch.

Pennsylvania attracted such groups in prerevolutionary times because William Penn had promised them freedom from the religious persecution they had suffered in Europe. They came by the thousands to settle the rich river valleys of the Susquehanna, Lehigh, Schuylkill and Delaware Rivers.

The Pennsylvania Dutch settlers could conveniently be divided into about two major factions, the Plain Dutch and the Fancy Dutch. These factions could further be divided into the religious groups which composed them. Some of the more popular groups included the Amish, the Schwenkfelders, the Moravians, the Mennonites, and ad infinitum.

Contrary to the belief of many, these groups did not emigrate from the Netherlands, but came from the then divided Germany. The question then arises, why are they known as Pennsylvania Dutch? The answer is actually rather simple. Americans are notorious for ruining the King's English, and well, when it came to German they certainly outdid themselves. These German settlers referred to themselves as the "deutsch," meaning that they had come from Rhineland. Soon "lazy-lipped" Americans had corrupted the pronunciation to be synonymous with "Dutch." Hence, today, while touring Southeastern Pennsylvania, one encounters signs at every corner advertising "Gud Pennsylvania Dutch Cookin'."

The Pennsylvania Dutch have become famous for their delicious cooking throughout the world. They invented many unique recipes while others reached distinction in the Pennsylvania Dutch kitchens.

For instance, the Pennsylvania Dutch have been the curse of many

THE TREE OF LIFE

reducing housewives who have munched their way to added pounds on an irresistable Pennsylvania Dutch snack known as the pretzel.

The pretzel, although not actually of Pennsylvania Dutch origin, has established Reading, in Berks County, as the Pretzel capital of the United States. Today, Reading produces almost one-third of all the pretzels consumed in this country, and one can be sure that the pretzel has left its mark on Pennsylvania Dutch heritage.

The name "pretzel" has a rather interesting background. A "pretzel" is not a "pretzel," but a "bretzel," and a "bretzel" was once a "braceiola" a Latin word meaning "little reward." It is believed that the pretzel was a reward to children who were adept at learning their prayers. As for the design itself, it signifies the folded arms over the breast of a person who is praying.

Among the greatest principles of Pennsylvania Dutch culinary traditions is the "seven sweets and the seven sours." Now, you are probably a little confused as to what these are. These are the relishes which graced even the poorest table settings in the Pennsylvania Dutch home. There were such delightful things as rhubarb jam, rhubarb marmalade, lemon honey, cherry relish, pear marmalade, quince marmalade, green tomato relish and so on. But there were always a vast selection of "sweets and sours." Today there are few bona fide eating establishments serving Pennsylvania Dutch cuisine. Generally, you end up with a place mat of witty sayings, ketchup, mustard, and sugar if you so desire for your coffee. As for "seven sweets and seven sours" -- "you should live so long!" (Of course you can impress your friends with the witty sayings on the place mats, such as "Throw the cow over the fence some hay." Unfortunately, you may have trouble convincing your stomach that this is a worthy substitute.

Another rather fascinating dish are the Fastnachts to which the Pennsylvania Dutch awake on the morn of Shrove Tuesday. Fastnachts are doughnuts fried in deep fat. The custom has spread beyond the Pennsylvania Dutch tradition, and the bakery business is booming the Monday before.

"Schnitz and knepp" is also a very popular and tasty treat. This consists of either dried pears or apples cooked in ham broth with dumplings. Once sampled, this dish isn't soon forgotten.

Chicken Pot Pie, Shoo-fly Pie, buttered noodles and the like need little explanation, for they are as common as Mom's apple pie (which by the way is also considered to have reached its height of perfection in Pennsylvania Dutch kitchens). Anyone who has participated in the national pastime of television knows that to sample egg noodles is "to get to know what goo-ood is." As for shoo-fly pie, it also has become a popular treat throughout America.

The Pennsylvania Dutch have been laughed at and ridiculed for their colloquial speech. It is often quite ironic to note that those who laugh the loudest are frequently as guilty, or even more guilty, of gross gramatical errors.

Expressions such as "The bell don't make, you better give the door a bump" are far from uncommon. A Pennsylvania Dutchman may mention the passing of the family patriarch by saying "Grandpa is all." Such a comment often results in an outbreak of riotous laughter. However, we have often courteously nodded when some self righteous Anglo-Saxon exclaims "We saw Ron's girl in the car with the red hair," or "President Nixon pointed out that we had made great progress during his speech."

Today, whenever we see one of those handsome place mats, which is filled with those witty sayings, in one of those pseudo-Pennsylvania Dutch restaurants, we grit our teeth and think, the only attribute this joint has which could be even remotely related to the Pennsylvania Dutch is the trait of frugality. The trouble is that they have taken this attitude to the point of bare-faced greed with exorbitant prices and miniscule servings.

The Pennsylvania Dutch are reknowned for their colorful design and art work. They believe in the embelishment of everything from bibles to barns. A great myth has evolved concerning the Pennsylvania Dutch hex signs. For some reason, travel editors of big city papers take great pains in constructing intricate explanations about how the superstitious Dutchman paints these designs on his barn to ward off evil spirits. The most candid denial can be had in the Dutchman who explained, "It's chust for pretty!"

The fact is that the hex signs are only colorful geometric motifs used to break up the monotony of the barn. Many of the designs are believed to be derived from a representation of a tulip.

While hex signs are merely decorative, other designs do have great meaning. Such is the case of the "Distelfink bird" which can be traced for its origin back to Conrad Beiseel and the Ephrata Cloisters. The design consists of a mother bird, bent forward and downward from an arched neck with her beak pressed against her breast. Blood flows from the painfully self-inflicted wound - - blood with which she can feed her young. This closely parallels Beissel's teachings of self denial and sacrifice for religious purposes.

Another design which has great symbolic significance is "The Tree of Life Design" which is most expressive of the inhibited qualities of the Pennsylvania Dutch, that being a steadfast recognition of the fact that all good things coming from the soil are God-given in proportion to the labor of love by which they were derived. The stolid tree-like pyramidal form suggests the blade, the flower and the seed in the circle of the earth and with it, strength, fertility, and immortality.

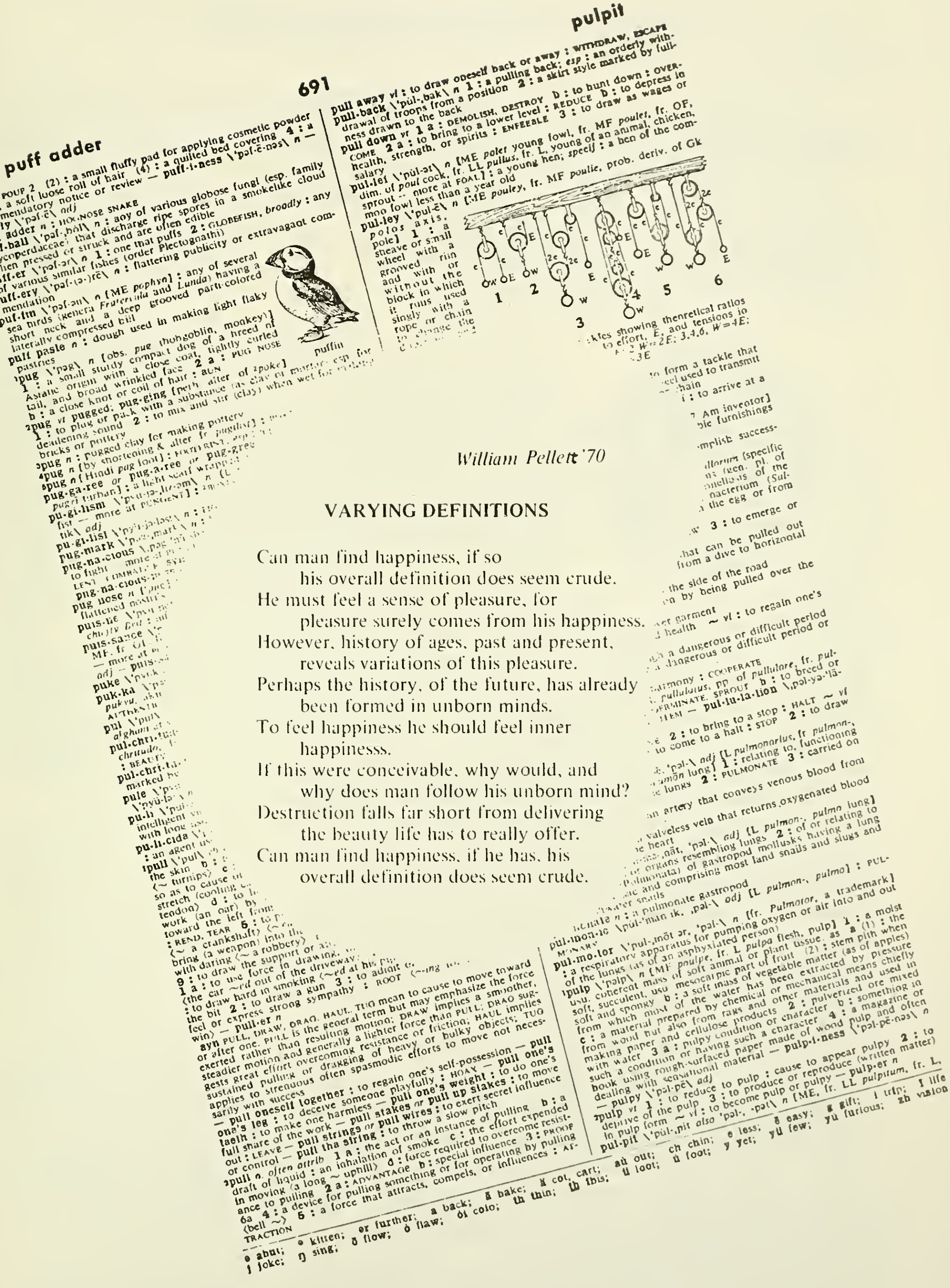
What we have tried to do is lead you to a realization of a great culture which lies at your doorstep. It is well worth your time to visit Kutztown, Lancaster and some of the other nearby centers of this wonderful American culture. We hope that we have convinced you that there is more to this unique section of Americana than a three-hundred pound hamburger queen, paper placemats with funny sayings, and draft birchbeer.

* * *

Brian Rice '71

OLD FRIENDS ARE HARD TO FIND

I knew him,
His name in the back of a library book.
A friend,
Gone now to pursue his mind over the next hill.
But who else will see him
As they glance at his name?
His friends.
Later, the world may know him,
But if not,
His name remains in that book.
The book with its worn pages,
This man at his ebb tide,
Old friends are hard to find.



William Pellett '70

VARYING DEFINITIONS

Can man find happiness, if so
his overall definition does seem crude.
He must feel a sense of pleasure, for
pleasure surely comes from his happiness.
However, history of ages, past and present,
reveals variations of this pleasure.
Perhaps the history, of the future, has already
been formed in unborn minds.
To feel happiness he should feel inner
happinesss.
If this were conceivable, why would, and
why does man follow his unborn mind?
Destruction falls far short from delivering
the beauty life has to really offer.
Can man find happiness, if he has, his
overall definition does seem crude.

Richard W. Hoffman, Jr. '70

REPLANTING THE STRIP MINE SPOILS

Editors' Note:

The following is a summary of a paper presented by Mr. Hoffman at the 24th Annual Soil Conservation Society of America meeting at Colorado State University, Fort Collins, Colorado on August 10, 11, 12, 13, 1969.

Mr. Hoffman wishes to thank Dr. Miroslaw M. Czapowskyj, Soil Scientist for the U. S. Forest Service, Northeast Forest Experiment Station of the Kingston Unit, Dr. Julian Prundeanu and Dr. James Work for their assistance in preparing this article.

One hundred and forty years ago the Anthracite Coal Area, located in the Northeastern section of Pennsylvania, was a rich mountainous land with deep forests and numerous clear, sparkling streams. Naturally formed by glacial till deposits in the northern section of the area, this beautiful countryside held beneath its green carpet a vast storeroom of hard coal known as Anthracite. As time passed and large industry became dependent on coal as its main source of fuel, coal extraction increased at an overwhelming rate. Large mining camps were centered around rich coal deposits, which resulted in what is known as the Four Great Coal Fields of Pennsylvania. The Fields are called the Northern, Eastern-Middle, Western-Middle and Southern, and extend into ten counties of the State. A number of large cities are also located in the area such as: Scranton, Carbondale, and Wilkes-Barre. The people of the region were at one time involved totally in coal mining activities. Today the picture has changed considerably.

In the past coal mining took place underground. Tunnels were driven into the side of a mountain known to have a good vein of coal beneath it. The coal was mined mostly by hand labor, an extremely dirty and dusty procedure. The coal was then taken from the mine and delivered to the coal breaker. Here it was cleaned of all foreign materials and waste remains. It was then sorted into the correct sizes and delivered to the coal buyers. Those deep mine wastes were dumped on large spoil piles and forgotten by the miners.

As more and more machines were used in the coal mining industry, new ways of extracting the coal were practiced. The technique of strip mining became very popular as new machines made their entrance into the area. Strip mining is considered to be a more economical way to extract coal from the earth. The machines used are enormous bulldozers and gigantic power shovels which up-root all vegetation and dig hundreds of feet into the earth's surface to extract a vein of coal. The coal is then graded and delivered to the consumers.

The remains of this operation are frightening. These large spoil banks, where debris has been piled into steep, sloping banks and huge, deep holes are not capable of supporting growth. This accounts for an area of 480 square miles in size (1:5). Of this spoils area, seventy-five per cent is the result of strip mining with half of this amount showing no sign of vegetation (2:4).

Recent legislation requires back filling of the newly dug strip mines. Four hundred eighty square miles of land have been disrupted and steps must be taken to restore this area to the once beautiful and majestic sight it was before coal mining operations took place.

Federal, state, and local governments are concerned with the problems of reclaiming the strip mine area. Private citizens and companies in the area are also involved. Programs of revegetation and recreation are the major objectives.

Revegetating this area of 480 square miles or 112,000 acres of waste land is a major task in itself. Therefore, a master plan and scientific approach to the program and problems of the region is necessary. But what type of vegetation would be suitable in reclaiming the spoils and what would be the best approach to the problem?

Revegetating the area by using reforesting techniques seems to be the most feasible answer to the problem at this time. In this way trees can be planted now on the strip mine spoils and become the forests of tomorrow. The Northeast Forest Experiment Station located in Kingston, Pennsylvania, in cooperation with the Pennsylvania Power and Light Company, Mine and Mineral Industries and others, have expanded their research efforts to include aesthetic improvement of the Anthracite Region. The Experiment Station studied the problems of the area and formulated a systematic approach to its solution.

First, the Anthracite Coal Region was mapped and classified according to the type of strip-mine spoils or deep-mine waste. Next, a method of reforesting the area which the majority of the public would see was studied. A plan was formulated to plant trees along major highways and around largely populated areas to screen the bleak landscape from the public's eye. Year around screening ability of the vegetation is necessary; therefore, evergreens were tested and studied. After calculation the number of trees needed to fulfill the planting needs, the Experiment Station suggested no less than one million trees would be needed for screening the area. To reforest the entire area with cover plantings, the Experiment Station suggested 100 million trees would be needed. By reforesting the entire area, soil erosion and water pollution would be kept at a minimum.

The proper selection of plants for reforesting the Anthracite region is important. Trees such as Jack Pine, Red Pine, White Pine, Virginia Pine, Scotch Pine, Norway Spruce, Japanese Larch, European Larch, Black Locust and Hybrid Poplar are of interest. Other vegetative crops such as grasses and legumes are being studied in the hope of finding a quick-growing cover crop.

One type of fast growing plant is Crownvetch, (*Coronilla vara* L.) It was found to be well adapted to the breaker refuse when high lime applications are applied.

Other plants are being studied with the hope of finding a plant adaptive to hydro-seeding. This is a mechanical seed spreading operation which plants seeds mixed in mulch and in fertilizer and spreads the mixture under high water pressure onto the desired location. With machines such as this, the project of revegetating the spoil banks can be achieved. However, many problems exist in the area.

The problem of time is one in particular. Trees take time to grow and establish good, deep, healthy stands; thus, it will require many years of revegetate this land. Fertility and acidity must be compensated for because the spoil waste varies a great deal. A range in ph of 2.8 to 7.0 can be found throughout the Anthracite Region. A ph of 4.0 is most desirable.

Soil and water erosion must be considered along with the possiblity of rock slides and the necessity of grading a slope to maintain a specific spoil type and texture to some degree.

Much work is to be accomplished in the future in order to solve these problems and to solve them successfully in a reasonable length of time. The project of replanting the strip mine spoils is indeed a serious and real problem. People living in this area have suffered enough and it is time we look to the future and try with all our might and God given riches to restore this area of the Anthracite Coal Region.

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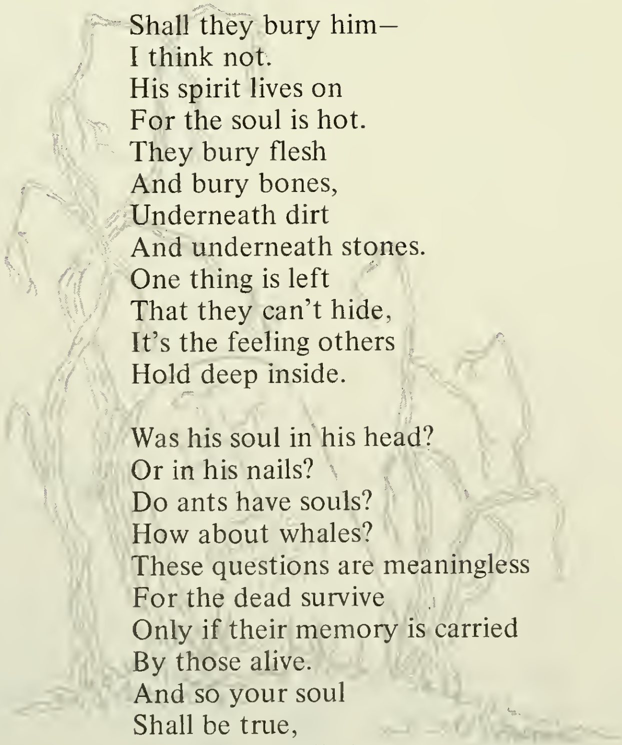
IN MEMORY

Richard Polgar '72



Shall they bury him—
I think not.
His spirit lives on
For the soul is hot.
They bury flesh
And bury bones,
Underneath dirt
And underneath stones.
One thing is left
That they can't hide,
It's the feeling others
Hold deep inside.

Was his soul in his head?
Or in his nails?
Do ants have souls?
How about whales?
These questions are meaningless
For the dead survive
Only if their memory is carried
By those alive.
And so your soul
Shall be true,
Because we will always
Carry memory of you.

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